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(54) INK REPELLING LAYER AND PRINTING PLATE

(57)Abstract:

PROBLEM TO BE SOLVED: To supply a planographic printing original plate excellent in ink repellency, printing durability and economical efficiency by solving various points at issue of an ink repelling layer comprising a hydrophilic resin layer used in a conventional damping planographic printing plate.

SOLUTION: The ink repelling layer comprising the hydrophilic crosslinked resin layer based on a hydrophilic polymer and having specific viscoelasticity is used as a non-image part. A planographic printing plate excellent in ink repellency and printing durability is obtained from the planographic printing original plate. A simple manufacturing process excellent in economical efficiency can be provided. Since a developing process is unnecessary in a plate making process, the generation of waste can be avoided.

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CLAIMS

[Claim(s)]

[Claim 1] It is the ** ink layer which a ** ink layer consists of a hydrophilic bridge formation resin layer, and this hydrophilic bridge formation resin layer uses a hydrophilic polymer as a principal component, and is characterized by satisfying the following conditions.

$$0.01 < (\tan \delta - 0.35) / WA < 0.63 \quad (1)$$

$$0.35 < WA < 8.0 \quad (2)$$

$$\log(\tan \delta) \leq \log(18.28 - WA) - 1.31 \quad (3)$$

$$\tan \delta = G' / G'' \quad (4)$$

$$WA = (W_{wet} - W_{dry}) / W_{dry} \quad (5)$$

However, the storage modulus and loss modulus in G' and 100 degrees C [in / in respectively G'' / dynamic viscoelasticity measurement of a ** ink layer] are expressed, and mass [in / in W_{dry} / the dryness of a ** ink layer] (g/m^2) and W_{wet} express the mass (g/m^2) after being underwater immersed for 25 degree-Cx 10 minutes.

[Claim 2] The original edition for printing with which the ** ink layer which consists of a hydrophilic bridge formation resin layer prepared in the base material through direct or other layers is characterized by satisfying claim 1.

[Claim 3] The printing version from which light was irradiated at claim 1 or the original edition for printing of 2, and the ** ink nature of a hydrophilic bridge formation resin layer was changed to parent ink nature.

[Claim 4] The printing version according to claim 3 whose light to irradiate is 700-1200nm.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for the printing version, especially lithography, and relates to the ** ink layer of a version, and the lithography version using it.

[0002]

[Description of the Prior Art] Lithography is the method using the adhesive difference in ink which imprints and prints ink to printing hands-ed, such as paper, after making ink impress only on the streak section, making the streak section and the non-streak section exist in the same flat surface mostly fundamentally, and using ink receptiveness and the non-streak section as ink rebounding nature for the streak section, and a PS plate is usually used for such lithography.

[0003] It divides roughly into a PS plate and those with two kind and one apply an oleophilic photopolymer layer on the aluminum substrate by which hydrophilization processing was carried out. With the technique of a photolithography The PS plate with water which wears the streak section when a sensitization layer remains, carries out ink, the above-mentioned aluminum substrate front face exposes the non-streak section, and the layer of dampening water is formed in this front face, repels ink, and carries out image formation on the other hand, Another is a water-less PS plate using the layer which crawls the ink which consists of silicone rubber, a fluoro-resin, etc. instead of a dampening water layer, and the so-called water-less Taira version.

[0004] From the outstanding printing properties (print durability, resolution, the degree of freedom of ink, image repeatability, etc.), the former PS plate with water is used so widely that about 90% of all PS plates are occupied. However, as for this version, aluminum was usually used for the base material, with high water retention, during printing, the strong adhesive property with a sensitization layer was searched for, and this aluminum front face was so that an oleophilic photopolymer layer's exfoliation dedropping [this front face to] might not be found. Therefore, it usually grained this aluminum front face, processing of anodizing further this front face that it grained if needed was performed, and improvement in water retention and the adhesive reinforcement to this photopolymer layer have been measured. Moreover, in order to acquire the preservation stability of this photopolymer layer, generally as for this aluminum front face, chemical treatments, such as zirconium fluoride and a sodium silicate, are performed. Thus, the PS plate with water has a very complicated production process, and the simplification was desired.

[0005] Research of the ** ink (hydrophilicity) layer which has an aluminum substrate, an EQC, or a printing property beyond it, and could moreover manufacture at the simple process that the above-mentioned problem should be solved, and was excellent also in economical efficiency is made, and the proposal of the new ingredient replaced with an aluminum substrate is made.

[0006] For example, the approach of forming a sensitization layer in the base material which formed the ** ink (hydrophilicity) layer which replaces with an aluminum substrate and becomes JP,56-2938,B from hydrophilic polymeric materials is proposed. However, although the urea-resin was applied as a ** ink (hydrophilicity) layer on the waterproof layer of a polyvinyl chloride, polyurethane, and the aldehyde condensate of polyvinyl alcohol, this layer was inferior also to adhesion with a photopolymer layer in this approach the top where ink rebounding nature (a hydrophilic property, water retention) is inadequate, and print durability was not enough.

[0007] A hydrophilic radical polymerization compound is applied on a base material, hydrophilization processing of this support surface is carried out by the exposure of an activity beam of light, and the approach of applying a photopolymer layer on it is proposed by JP,57-179852,A. However, the hydrophilic surface layer formed by this approach was also upright, and that of ink rebounding nature was inadequate,

and it was lacking also in print durability.

[0008] the hydrophilic swelling layer to which the non-image section becomes JP,8-292558,A from the phase separation structure of a hydrophilic polymer phase and a hydrophobic polymer phase -- moreover, further, the hydrophilic swelling layer which has a specific coefficient of water absorption as the non-image section in JP,8-282142,A was not that with which these hydrophilic swelling layers are also not necessarily satisfied of both ** ink nature and print durability, although the hydrophilic swelling layer which has a specific elastic modulus in JP,8-282144,A was indicated. Moreover, these versions needed to sink the photosensitive constituent into this hydrophilic swelling layer, and needed to flush this photosensitive constituent after exposure.

[0009] On the other hand, practical use is widely presented with the version for straight-writing mold lithography which scans and carries out direct writing of the direct laser light to the printing version in recent years.

[0010] For example, what is constituted from inorganic pigments, such as water-dispersion resin, such as hydrophilic polymers, such as PVA and starch, and a synthetic-resin emulsion, and a silica, and a calcium carbonate, by the ** ink layer is proposed by the USP No. 2532865 official report. However, this layer also had weak water retention and its ink rebounding nature was inadequate.

[0011] Moreover, the straight-writing mold lithography original edition using the hydrophobic polymer which desensitization processing hydrolyzes as a ** ink layer, and a hydrophilic radical produces is proposed by JP,63-256493,A.

[0012] Moreover, the image section is formed in the image acceptance layer prepared on the base material with a toner by the electrophotography method as a simple gestalt of a PS plate with water. The version which makes a toner a resist, carries out desensitization processing of the non-image section with an etching solution etc., and is made to change the image acceptance layer of the non-image section into an ink rebounding layer, and the straight-writing mold lithography original edition which prepares a hydrophilic layer in a base material and forms the image section in this layer with a toner by the electrophotography method are also proposed.

[0013] Although it is the thing of the property which hardly shows ink rebounding nature, and it is necessary to use desensitization processing and a hydrophilic polymer in large quantities in order to obtain the ink rebounding nature of ***** and practical use level if desensitization processing is needed and you have none of these processings in order that each such the straight-writing mold lithography original edition may change an image acceptance layer into an ink rebounding layer, it is in the inclination inferior to a water resisting property, and printing endurance falls. Moreover, when the hydrophilic property was raised, there were troubles, like it is in the inclination for an adhesive property with image formation ingredients, such as a toner, to fall. On the other hand, in order to improve printing endurance, when the addition of a deck-watertight-luminaire-ized agent is made [many], or it adds a hydrophobic polymer and the water resisting property was increased, there was a trouble that a hydrophilic property fell and ink rebounding nature fell sharply.

[0014] On the other hand, it is a straight-writing mold, and versions various by that of development needlessness are proposed by JP,7-1849,A, JP,8-282142,A, JP,8-282144,A, JP,9-54425,A, JP,9-54428,A, JP,9-54429,A, the international public presentation number WO No. 20698 [97 to], JP,11-301130,A, etc., and the hydrophilic layer of ** ink nature which consists of various hydrophilic polymers and hydrophilic pigments in it is used. However, the PS plate with water always needed to control the amount of dampening water on the occasion of printing to the pan with which these hydrophilic layers were not fully satisfied of both ** ink nature and print durability, either, and a considerable technique and experience have been needed for controlling the fitness amount of dampening water at it. Moreover, use tends to be severely regulated from the position of a labor hygiene environment or waste water treatment, the cure serves as pressing need, and what is satisfied with the conventional various hydrophilic layers of these all did not have IPA (isopropanol) added by dampening water as an indispensable component in recent years.

[0015]

[Problem(s) to be Solved by the Invention] As described above, the hydrophilic layer of the versatility proposed replaced with the aluminum plate of the conventional PS plate with water had a problem practically in respect of a hydrophilic property (greasing nature), the engine performance of versions, such as a water resisting property (print durability), the ease of manufacture of a version and platemaking workability, or economical efficiency. Then, this invention is supplying the lithography version using the ** ink layer used for the lithography version which solves a trouble which the former's described above, does not have a greasing, and was excellent in print durability, and was excellent also in economical efficiency,

and its ** ink layer. Furthermore, another purpose is offering the ** ink layer for the printing version which can be engraved even if it abolishes the development process which needs waste treatment, such as a developer, and does not use the large-scale and expensive platemaking equipment of dedication, and the printing version using it in a platemaking process.

[0016]

[Means for Solving the Problem] this invention persons inquired wholeheartedly, in order to solve the above mentioned trouble, and a header and this invention were completed for the hydrophilic property (greasing nature) of a ** ink layer and a water resisting property (print durability) having the water absorption and the dynamic viscoelasticity property, and relation of this layer. Namely, this invention (1) It is the ** ink layer which a ** ink layer consists of a hydrophilic bridge formation resin layer, and this hydrophilic bridge formation resin layer uses a hydrophilic polymer as a principal component, and is characterized by satisfying the following conditions.

[0017]

$$0.01 < (\Delta - 0.35) / WA < 0.63 \quad (1)$$

$$0.35 < WA < 8.0 \quad (2)$$

$$\log(\Delta) \leq \log(18.28 - WA) - 1.31 \quad (3)$$

$$\Delta = G' / G'' \quad (4)$$

$$WA = (W_{\text{wet}} - W_{\text{dry}}) / W_{\text{dry}} \quad (5)$$

However, the storage modulus and loss modulus in G' and 100 degrees C [in / in respectively G'' / dynamic viscoelasticity measurement of a ** ink layer] are expressed, and mass [in / in W_{dry} / the dryness of a ** ink layer] (g/m^2) and W_{wet} express the mass (g/m^2) after being underwater immersed for 25 degree-Cx 10 minutes. Furthermore, this invention (2) The ** ink layer which consists of a hydrophilic bridge formation resin layer prepared in the base material through direct or other layers It is the original edition for printing characterized by satisfying the above (1) (3). Light is irradiated at the original edition for printing of (1) or (2). It is the printing version from which the ** ink nature of a hydrophilic bridge formation resin layer was changed to parent ink nature (4). The irradiating light is the printing version of the aforementioned (3) publication which is 700-1200nm.

[0018]

[Embodiment of the Invention] It is characterized by this invention consisting of a ** ink layer which consists of a hydrophilic bridge formation resin layer to which the non-image section uses a hydrophilic polymer as a principal component.

[0019] In this invention, a well-known thing can be used as a hydrophilic polymer, and there are a natural system polymer and a synthetic system polymer. For example, the hydrophilic polymer of a publication is mentioned to "Functional Monomers" (Y. Nyquist work, Dekker), a "water soluble polymer" (the Nakamura work, chemical-industry company), "the newest processing and the reforming technique and the collection of application development synthesis engineering data" (the KEIKAI publication section) of water soluble polymer moisture powder type resin, "application, a commercial scene" (CMC) of a water-soluble polymer, etc. An example is given below.

[0020] As a natural system polymer, those, such as celluloses, such as starch which carried out the graft polymerization of the partial saturation monomers, such as native proteins, such as gelatin, casein, and soybean protein, alginate, starch, and an acrylic acid, and methyl cellulose, a nitrocellulose, a carboxymethyl cellulose, hydroxyethyl cellulose, a methoxy cellulose, is mentioned.

[0021] As a synthetic system polymer, a vinyl acetate system polymer and its saponification polymer, A polyethylene oxide system polymer, a Pori (ethyleneoxide-propylene oxide) copolymerization system polymer, An aquosity urethane system polymer, a water-soluble polyester system polymer, an acrylic-acid (meta) system polymer, An acrylamide system polymer, N-vinyl carboxylic amide system polymer, (Meta) An acrylic copolymer, an acrylic (meta) copolymer emulsion, (Meta) The saponification object of a polyacrylonitrile system polymer, a hydroxyethyl (meta) acrylate system polymer, (Vinyl methyl ether-maleic anhydride) The crosslinked polymer of these above-mentioned polymers, such as a system copolymer, a maleic-anhydride system copolymer, and a vinyl-pyrrolidone system copolymer, is mentioned. In addition, it can set to the above-mentioned hydrophilic polymer.. A system polymer means a homopolymer and various copolymers.

[0022] When a synthetic system polymer is explained in more detail, the polymer which has the substituent of hydrophilic properties, such as a carboxylic-acid radical, a sulfonic group, a phosphonic acid radical, a hydroxyl group, an alkoxy methyl group, and an amide group, in a side chain, and also has the functional group which reacts with a cross linking agent is desirable. And the homopolymer which comes to carry out

the polymerization of the polymerization nature partial saturation monomer which has the substituent which generates these radicals by hydrophilic substituent which was described above to the side chain, or hydrolysis, for example, and the polymerization nature partial saturation monomer which has a cross linking agent and the functional group which reacts, or a copolymer is mentioned.

[0023] As a polymerization nature partial saturation monomer which has a carboxylic-acid radical The monoester of partial saturation dibasic acids, such as a little salt radical partial saturation acids, such as an acrylic acid, an itaconic acid, a fumaric acid, a maleic acid, and its anhydride, or these dibasic acids, (Meta) The monoamide again as a polymerization nature partial saturation monomer which has a sulfonic group Sulfoethyl (meta) acrylate, an acrylamide (meta) methyl propane sulfonic acid, A vinyl sulfonic acid, vinyl methylsulfonic acid, isopropanol ** nil methylsulfonic acid, The sulfate of the alcohol which added ethylene oxide or propylene oxide to the acrylic acid (Meta) A (elemi Norian RS-30 [for example,] of Sanyo Chemical Industries, Ltd.) AKURIRO (meta) yloxy ethyl sulfonic acid, The ester of monoalkyl sulfo succinate and the compound which has an allyl group For example, (elemi Norian JS2 of Sanyo Chemical Industries, Ltd., the radio-and-TV mull S-180 of Kao Corp., or S180A), The resultant of monoalkyl sulfo succinate and glycidyl (meta) acrylate, And Antox of Japanese Emulsifier MS60 grade as a polymerization nature partial saturation monomer which has a phosphonic acid radical A vinyl phosphoric acid, phosphoric-acid monochrome (2-hydroxyethyl) (meta) acrylate, the monochrome (2-hydroxyethyl) (meta) acrylate of phosphoric-acid monoalkyl ester, etc. are mentioned. The polymerization nature partial saturation monomer which has these acid radicals may be neutralized by amines, such as alkanolamines, such as alkylamines, such as alkaline earth group metals, such as alkali metal, such as sodium, a potassium, and a lithium, calcium, and magnesium, ammonia, monomethylamine, dimethylamine, a trimethylamine, ethylamine, diethylamine, and triethylamine, monoethanolamine, diethanolamine, triethanolamine, methyldiethanolamine, ethyl diethanolamine, dimethylethanolamine, and diethyl ethanolamine. Moreover, you may neutralize, after carrying out a polymerization.

[0024] As a polymerization nature partial saturation monomer which has a hydroxyl group and an alkoxy methyl group Hydroxyethyl (meta) acrylate, hydroxypropyl (meta) acrylate, Hydroxy butyl (meta) acrylate, polyethylene-glycol monochrome (meta) acrylate, Polypropylene-glycol monochrome (meta) acrylate and methylol (meta) acrylamide, The methoxymethyl (meta) acrylamide which is the condensate of this methylol (meta) acrylamide, and methyl alcohol and butyl alcohol, butoxy methyl (meta) acrylamide, vinyl acetate, etc. are mentioned.

[0025] As a polymerization nature partial saturation monomer which has an amide group, no permuting or permutation (meta) acrylamide, no permuting or a permutation itaconic-acid amide, no permuting or a permutation fumaric-acid amide, no permuting, or a permutation maleic-acid amide is mentioned. Moreover, no permuting or permutation maleic-acid imide is also contained in the partial saturation monomer which has the amide group of this invention. From that of no permuting or permutation (meta) acrylamide, as an example Acrylamide, N-methyl (meta) acrylamide, N, and N-dimethyl (meta) acrylamide, (Meta) N-ethyl (meta) acrylamide, N, and N-diethyl (meta) acrylamide, N and N-dimethylaminopropyl (meta) acrylamide, N-isopropyl (meta) acrylamide, Die acetone (meta) acrylamide, methylol (meta) acrylamide, Methoxymethyl (meta) acrylamide, butoxy methyl (meta) acrylamide, Acrylamide system monomers, such as sulfonic-acid propyl (meta) acrylamide and acryloyl morpholine (meta), N-vinyl acetamide, N-vinyl formamide, N-vinyl pyrrolidone, etc. are mentioned. Moreover, in the case of dibasic-acid amides, such as an itaconic-acid amide, a fumaric-acid amide, and a maleic-acid amide, both both [one of the two or] may amidate. When one of the two has amidated, another carboxyl group may be esterified. Moreover, the amide group may be permuted by the alkyl group etc.

[0026] The carboxylic-acid radical, sulfonic group which were described above on the other hand as a cross linking agent and a functional group which reacts, A phosphonic acid radical, a hydroxyl group, an alkoxy methyl group, an amide group, and a glycidyl group are mentioned. A carboxylic-acid radical, a sulfonic group, a phosphonic acid radical, a hydroxyl group, an alkoxy methyl group, As a polymerization nature partial saturation monomer in which the monomer described above as an example of the polymerization nature partial saturation monomer which has an amide group has a glycidyl group, glycidyl (meta) acrylate, p-vinyl phenyl glycidyl ether, etc. are mentioned.

[0027] The polymerization nature partial saturation monomer and the monomer which can be copolymerized described above on the occasion of the polymerization of a hydrophilic polymer besides the polymerization nature partial saturation monomer which has the hydrophilic substituent described above in the hydrophilic polymer of this invention, and the polymerization nature partial saturation monomer which has a cross linking agent and the functional group which reacts may be copolymerized in the range which

does not lose the effectiveness of this invention. As a monomer which can be copolymerized, for example Methyl (meta) acrylate, Ethyl (meta) acrylate, butyl (meta) acrylate, 2-ethylhexyl (meta) acrylate, Dimethylaminoethyl (meta) acrylate, diethylaminoethyl (meta) acrylate, Phenoxy ethyl (meta) acrylate, benzyl (meta) acrylate, Isoboronyl (meta) acrylate, adamantyl (meta) acrylate, cyclohexyl (meta) acrylate, styrene, alpha - Methyl styrene, acrylonitrile, a methacrylonitrile, etc. are mentioned. In addition, in the aforementioned description, an acrylic acid (meta), acrylate (meta), acrylamide (meta), etc. mean both an acrylic acid, a TAAKURIRU acid, acrylate and methacrylate, and acrylamide and meta-acrylamide, respectively.

[0028] The polymerization nature partial saturation monomer which has the above mentioned hydrophilic group, a cross-linking polymerization nature partial saturation monomer, and the monomer which can be copolymerized may use one sort or two sorts or more.

[0029] Moreover, it mixes suitably and the hydrophilic polymer used for this invention can use [independent or] two or more sorts.

[0030] The hydrophilic bridge formation resin layer of this invention has the approach of making reactant functional groups, such as a carboxyl group, a hydroxyl group, a methylol amide group, an epoxy group, a carbonyl group, and an amino group, exist in the approach and the hydrophilic polymer using a cross linking agent, and carrying out self-bridge formation, if it is desirable that the bridge is partially constructed over a hydrophilic polymer and it is in charge of bridge formation. Moreover, crosslinking reaction may be bridge formation of covalent-bond nature, or may be bridge formation of ionic bond nature.

[0031] As a compound used as a cross linking agent, the well-known polyfunctional compound which has cross-linking is mentioned. The Pori epoxy compound, the poly isocyanate compound (what is blocked is included), The Pori mercapto compound, the Pori alkoxysilyl compound, a polyvalent-metallic-salt compound, Polyamine compound, an aldehyde compound, a hydrazine, a carbodiimide compound, A polycarboxylic acid compound, a urea-resin, melamine resin, benzoguanamine resin, the poly methylol compound, its alcoholic condensate, etc. are mentioned, this crosslinking reaction adds a well-known acid or basic catalyst, and promoting a reaction is performed.

[0032] As an example of the Pori epoxy compound, the glycerol JIPORIRISHIJIRU ether, polyethylene glycol diglycidyl ether, polypropylene glycol diglycidyl ether, trimethylolpropane polyglycidyl ether, trimethylolpropane polyglycidyl ether, sorbitol polyglycidyl ether, etc. are mentioned.

[0033] As an example of polyamine, ethylenediamine, diethylenetriamine, triethylenetetramine, tetraethylenepentamine, polyethyleneimine, a polyamide amine, etc. are mentioned.

[0034] As an example of the poly isocyanate compound, tolylene diisocyanate, Hexamethylene diisocyanate, diphenylmethane diisocyanate, Polymethylene polyphenyl isocyanate, xylylene diisocyanate, Cyclohexyl diisocyanate, cyclohexane phenylene diisocyanate, Naphthalene -1, 5-diisocyanate, isopropylbenzene -2, 4-diisocyanate, The poly isocyanate compounds, such as isophorone diisocyanate, and the so-called block isocyanate compound which blocked the adducts of these poly isocyanate compounds and polyhydric alcohol and the isocyanate radical of these poly isocyanate compound are mentioned. As polyhydric alcohol, ethylene glycol, a diethylene glycol, propylene glycol, neopentyl glycol, trimethylol propane, a polyethylene glycol, a polypropylene glycol, a glycerol, etc. are mentioned.

[0035] These cross linking agents can mix and use [independent or] two or more sorts. Since it dissolves or distributes and a hydrophilic polymer and a cross linking agent are used for the solvent which uses water as a principal component, they are a water-soluble and water-dispersion water polyfunctional compound as a desirable cross linking agent, and are the water Pori epoxy compound, polyamine compound, melamine resin, a urea-resin, benzoguanamine resin, the water poly isocyanate compound, etc.

[0036] In the hydrophilic bridge formation resin layer of this invention, in order to improve ** ink nature and print durability, inorganic or organic a filler and hydrophobic resin may be added. It is desirable to add hydrophobic resin and to distribute as a particle especially, to the phase to which this hydrophobic resin uses a hydrophilic polymer as a principal component in this layer. Furthermore, it can serve as the adhesion prevention when piling up a version and a version on the slipping disposition of a version, and little addition of the lubricant of ordinary temperature solid-states, such as stearin acid, a myristic acid, dilauryl thiodipropionate, octadecanamide, and zinc stearate, can be carried out at a hydrophilic layer.

[0037] The ** ink layer which consists of a hydrophilic bridge formation resin layer of this invention satisfies the following formula.

[0038]

$$0.01 < (\tan \delta - 0.35) / WA < 0.63 \quad (1)$$

$$0.35 < WA < 8.0 \quad (2)$$

$\log(\tan\delta) \leq \log(18.28 - W_A) - 1.31$ (3) $\tan\delta = G'/G''$ (4)

$W_A = (W_{\text{wet}} - W_{\text{dry}}) / W_{\text{dry}}$ (5)

However, the storage modulus and loss modulus in G' and 100 degrees C [in / in respectively G'' / dynamic viscoelasticity measurement of a ** ink layer] are expressed, and mass [in / in W_{dry} / the dryness of a ** ink layer] (g/m²) and W_{wet} express the mass (g/m²) after being underwater immersed for 25 degree-C x 10 minutes.

[0039] By making the value of a formula (1) into the above-mentioned range, it shall be hard to carry out a greasing and shall excel in print durability. When the value of a formula (1) exceeds 0.63, in **, which of ** ink nature or print durability worsens, and 0.50 or less [from these points] are still more desirable, and on the other hand, the value of a formula (1) is 0.15 or more preferably, in order that a hydrophilic bridge formation resin layer may absorb water.

[0040] Moreover, the film reinforcement of greasing prevention and the printing version can be kept moderate by satisfying a formula (2). Furthermore, by filling a formula (3), it can wear and ink nature and film reinforcement can be optimized.

[0041] The measuring method of the water absorption (W_A) in this invention is performed by the following approaches.

[0042] The part formed only from the non-streak section of the lithography version which it is going to measure is judged in predetermined area (attached to the base material), and it is immersed in 25-degree C purified water. the excessive moisture which adhered to the front face and rear face of this lithography version after being immersed for 10 minutes -- "HAIZE gauze" (cotton cloth: Asahi Chemical Industry Co., Ltd. make) -- base -- it wipes off quickly and weighing capacity of the swelling mass W_{wet} of this lithography version is carried out. Then, this lithography version is dried for about 30 minutes in 60-degree C oven, and weighing capacity of the dry mass W_{dry} is carried out.

[0043] The water absorption (W_A) of the hydrophilic bridge formation resin layer used for this invention is about 50 - 500% still more preferably 30 to 700% preferably from a viewpoint of ink rebounding nature and gestalt holdout, although there is especially no range specified.

[0044] Moreover, measurement (G'') of the storage modulus (G') in this invention and a loss modulus shall be measured by the following approaches.

[0045] Measurement of G' and loss-modulus G'' is performed for the storage modulus in a 30-200-degree C temperature requirement on the following conditions using a viscoelasticity measuring device (rheometer) RDA-** mold (REOMETO Rix Corp. make).

[0046] - Fixture : use a parallel plate with a diameter of 25mm.

[0047] - Test portion : it is a circle with a diameter [of 25mm], and a height of 1.5-3mm after the heating dissolution about hydrophilic bridge formation resin. It is cast and used for a board-like sample.

[0048] - test-frequency: -- 6.28 rad/second and measurement -- measure in automatical measurement mode after setting up distorted setting: initial value to 0.1%.

[0049] - Expanding amendment of a sample : automatic mode adjusts.

[0050] - Measurement temperature : carry out 2-degree-C/m temperature up to 25 degrees C - 250 degrees C.

[0051] Next, although the original edition for the lithography of this invention is explained, this invention is not limited to this.

[0052] The original edition for the lithography of this invention can form the hydrophilic bridge formation resin layer which uses a hydrophilic polymer as a principal component through direct or other layers at a base material, and can give photosensitivity by preparing the sensitization layer containing a photosensitive compound, a light absorption agent, etc. on this, or making a hydrophilic bridge formation resin layer contain a photosensitive compound, a light absorption agent, etc. In order to make a hydrophilic bridge formation resin layer contain a photosensitive compound, a light absorption agent, etc., these layers, such as a photosensitive compound and a light absorption agent, are infiltrated, or it mixes and a hydrophilic bridge formation resin layer is formed. Under the present circumstances, as a photosensitive compound used, a compound and a constituent with well-known constituent which consists of the photopolymer of a photopolymerization nature monomer and oligomer which are indicated by JP,8-282142,A, a polymer, and a photodimerization mold, the monomer which has an epoxy group, ** oligomer, and a diazonium salt compound and hydroxyl group-containing compound, constituent which consists of phenol resin and an acid generator are mentioned, for example. Moreover, the light used as a light absorption agent in case an image etc. is recorded on the printing version is absorbed, and if it is the compound changed into heat, there will be especially no limit. As an example of a light absorption agent, colors, such as poly methine system coloring

matter (cyanine dye), phthalocyanine system coloring matter, naphthalocyanine system coloring matter, dithiol metallic complex system coloring matter, a naphthoquinone, anthraquinone system coloring matter, triphenylmethane color system coloring matter, aminium, gene MONIUMU system coloring matter, an azo system disperse dye, India aniline metal complex coloring matter, and intermolecular mold CT coloring matter, a pigment, and coloring matter are mentioned. Furthermore, various carbon black can also be used. [0053] When a photosensitive compound which was described above is used, after exposing with light, development, a rinse, etc. need to remove the photosensitive compound of the unexposed section. However, such a process is complicated.

[0054] As a version which needs neither development nor rinse processing, the hydrophilic bridge formation resin layer of this invention containing a light absorption agent is prepared on the base material of parent ink nature, or the layer of the parent ink nature containing a light absorption agent is prepared on a hydrophilic bridge formation resin layer, and there is the ablation version from which a hydrophilic bridge formation resin layer or a parent ink layer is removed by the exposure of light. Although wet processes of this version, such as development and a rinse, are unnecessary, since a decomposition product is generated so much and adheres to a version or an exposure machine, the equipment from which the generated decomposition product is removed is needed.

[0055] The original edition for the most desirable printing of this invention is the so-called phase change type from which the ** ink nature of the hydrophilic bridge formation resin layer of this invention changes with the exposures of light to parent ink nature of version. As [indicate /, for example / as such a version / by JP,7-1849,A] A hydrophilic bridge formation resin layer is made to contain the microcapsule and block isocyanate compound of a compound which have a hydrophilic group and the functional group which reacts. It is made to react with a hydrophilic group with the heat by the exposure of light, and a hydrophilic property is made to lose, or a hydrophilic bridge formation resin layer Japanese Patent Application No. [No. 175995 / 11 to] like a publication decomposes partially with the heat by the exposure of light, and the version from which the hydrophilic property of this layer changes to parent ink nature is mentioned. also in the case of the version of such a phase change mold, said light absorption agent carried out is required, and this light absorption agent may prepare separately the layer which may contain in a hydrophilic bridge formation resin layer, and contains a light absorption agent. Of course, even if it is the version of such a phase change mold, the hydrophilic bridge formation resin layer containing various compounds, an additive, etc. must fill a formula (1).

[0056] From the point that the wavelength of the light used in this invention can deal with a version at a ** room, 700-1200nm is desirable and the above mentioned light absorption agent which has absorption to this field is used.

[0057] The printing original edition using the hydrophilic bridge formation resin layer of this invention can be manufactured by the following approaches. each above-mentioned component (a hydrophilic polymer and a cross linking agent --) which constitutes a hydrophilic bridge formation resin layer With optical - thermal-conversion matter and the other solvents which chose the component according to the bridge formation approach of the class and a hydrophilic polymer etc., a paint shaker, It dries and hardens, after applying the coating liquid which a ball mill, 3 rolls, DISUPA, a wave homogenizer, etc. were sufficient as, and dissolved, distributed, and was obtained on a base material by a doctor blade method, the bar coat method, the roll coat method, the gravure coat method, the die coat method, etc.

[0058] As a solvent used for coating liquid, water, ethanol, isopropanol, Alcohols called n-butanol, an acetone, and ketones called a methyl ethyl ketone Diethylene-glycol diethyl ETHERU, diisopropyl ether, dioxane, Glycol ether, such as a tetrahydro furan, ethylene glycol monomethyl ether, and propylene glycol monomethyl ether Ether called a diethylene glycol, ethyl acetate, and ester called butyl acetate Aliphatic hydrocarbon, such as aromatic hydrocarbon, such as toluene and a xylene, n-hexane, and a decalin, dimethyl formamide, dimethyl sulfoxide, acetonitriles, or these partially aromatic solvents can be used.

[0059] What is necessary is to take into consideration the engine performance and cost which are required of the printing field as a base material used for the printing original edition, and just to choose from a well-known ingredient. For example, plastics base materials, such as metal base materials, such as aluminum and steel, and polyester, and also paper, a synthetic paper, a waterproofing resin lamination, or coat paper is mentioned. Under the present circumstances, what performed surface treatment may be used for the base material itself for improvement in the adhesive property of a base material and said hydrophilic bridge formation resin layer. In the case of a metal base material, in the case of a sheet plastic, there are [corona discharge treatment, blasting processing, etc.] various polishing processings, anodizing, and silane coupling agent processing as an example of this surface treatment. Moreover, an adhesives layer can also be prepared

on a base material if needed.

[0060] It prepares an adhesives layer, when you generally need high print durability. It is necessary to set adhesives by the component of a hydrophilic bridge formation resin layer, and the base material to be used, and to choose and design them. Adhesives, such as various well-known acrylic, an urethane system, a cellulose system, an epoxy system, and a butyral system, can be used.

[0061] After forming the required film, the original edition for printing of this invention may laminate a film, in order to carry out calendering or to ***** a front face.

[0062] Although it can draw and print and development and rinse processing can also be performed depending on the need by carrying out scan exposure of the light direct to the original edition according to the document and image created and edited with an electronic typesetting machine, DTP, a word processor, a personal computer, etc. in order to describe above and to engrave the printing version using the created printing original edition, the version of these processings to perform [no] is more desirable. In case the offset press is equipped with the engraved version and it is printed, if required, after performing the usual etching processing, it can also print as it is.

[0063] Next, the printing approach using the direct printing version of this invention is explained.

[0064] A well-known lithography machine is used for printing of this invention. That is, a sheet, a rotary press, etc. of offset and a direct printing method are used.

[0065] After carrying out image formation of the direct printing version of this invention, the printing cylinder of these lithography machines is equipped and ink is supplied to this printing plate from the ink arrival ** roller which contacts.

[0066] The non-streak part which has a hydrophilic swelling layer on this printing plate is swollen with the dampening water supplied from a dampening water feeder, and repels ink. On the other hand, a streak part receives ink, supplies ink to an offset blanket drum front face or a printing hand-ed front face, and forms a printing image.

[0067] Below, an example explains this invention in more detail.

[0068]

[Example] Hereafter, although an example explains this invention concretely, this invention is not limited to this at all. In addition, among a sentence, as long as there is no notice especially, it is the mass section which is described as the section.

200% considerable amount (value at the time of making all monomers into 100%) of water was taught to the separable flask of 1500ml size of examples, and the temperature up was carried out to 80 degrees C under nitrogen-gas-atmosphere mind. Subsequently, feed was carried out over 2 hours into the separable flask, agitating a mixed solution 1 (2-hydroxyethyl acrylate (it being hereafter described as HEA) 10%, and acrylamide (it being hereafter described as AAm) 40%, and acrylonitrile (it being hereafter described as AN) 50%, and 50% considerable amount of water), and a mixed solution 2 (% [of potassium persulfate / 2.5], 50% considerable amount of water). The polymerization was continued at this temperature after that for 2 hours, and the hydrophilic binder polymer P-1 was obtained.

[0069] Subsequently, the coating liquid which consists of the following presentation which was beforehand distributed with for [bottom of room temperature / sufficient] 30 minutes with the paint shaker on the polyethylene terephthalate base material with a thickness of 180 micrometers, and which carried out after degassing was applied to the thickness of 5g/m² by the blade coating machine.

[0070]

Hydrophilic polymer ;P -1 74.0% Cymel 385 (melamine made from Mitsui SAITEKKU) 20.5% IR125 (cyanine dye made from Japanese photosensitive dye) 5.0% Dodecylbenzenesulfonic acid 1.5%, subsequently it was air-dry for 30 minutes, and 120 degrees C dried for 20 minutes in the vacuum dryer, it film-ized, the hydrophilic bridge formation resin layer was formed, and the printing original edition was obtained. The result of having performed dynamic viscoelasticity measurement of this hydrophilic bridge formation resin layer and measurement of absorptivity is shown in Table 1.

[0071] Heat printing of the printing image was carried out by the printer of 500mW semiconductor laser component loading which connected this printing version with the personal computer.

[0072] This version was trimmed in the predetermined dimension, the offset press (the HAMADA PRINTING PRESS CO., LTD. make, HAMADA611XL, hard blanket use) was equipped, and it printed to paper of fine quality (the used ink is BSD offset ink (black, Dainippon Ink make).). Dampening water used what diluted the etching solution 50 times with water. Even if it passes over the 20,000 sections, there is no greasing, and the image section has also been printed vividly. There was also no peeling of the printing version.

In the manufacture approach of the example 2 hydrophilic-property polymer P-1, the presentation of a mixed solution 1 was changed as follows, the polymer P-2 was obtained, and the printing version was obtained like the example 1 except having made the amount of P-2 into 59.0% for the amount of Cymel 385 under coating liquid presentation 35.5% further. The result of having performed dynamic viscoelasticity measurement of this hydrophilic bridge formation resin layer and measurement of absorptivity is shown in Table 1. It evaluated still like the example 1. Even if it passes over the 20,000 sections, there is no greasing, and the image section has also been printed vividly. There was also no peeling of the printing version.

[0073] Mixed solution 1 presentation; HEA 10%, AAm 80%, AN The printing version was obtained like the example 1 except having changed the presentation of a mixed solution 1 as follows, and having obtained the polymer P-3 10%, in the manufacture approach of the 50% considerable-amount example 3 hydrophilic-property polymer P-1 of water. The result of having performed dynamic viscoelasticity measurement of this hydrophilic bridge formation resin layer and measurement of absorptivity is shown in Table 1. It evaluated still like the example 1. Even if it passes over the 20,000 sections, there is no greasing, and the image section has also been printed vividly. There was also no peeling of the printing version. It evaluated.

[0074] Mixed solution 1 presentation; HEA 10%, AAm 75% Acrylic acid In the manufacture approach of the 10% and acrylic-acid sodium (it is hereafter described as AANa) 5%, and 50% considerable-amount example 4 hydrophilic-property polymer P-1 of water (It is hereafter described as AA) The presentation of a mixed solution 1 was changed as follows, the polymer P-4 was obtained, and the printing version was obtained like the example 1 except having made the amount of P-2 into 66.0% for the amount of Cymel 385 under coating liquid presentation 28.5% further. The result of having performed dynamic viscoelasticity measurement of this hydrophilic bridge formation resin layer and measurement of absorptivity is shown in Table 1. It evaluated still like the example 1. Even if it passes over the 20,000 sections, there is no greasing, and the image section has also been printed vividly. There was also no peeling of the printing version.

[0075] Mixed solution 1 presentation; HEA 10%, AAm 65%, AA 10%, AANa The printing version was obtained like the example 1 except having changed the presentation of a mixed solution 1 as follows, and having obtained the polymer P-5 15%, in the manufacture approach of the 50% considerable-amount example 5 hydrophilic-property polymer P-1 of water. The result of having performed dynamic viscoelasticity measurement of this hydrophilic bridge formation resin layer and measurement of absorptivity is shown in Table 1. It evaluated still like the example 1. Even if it passes over the 20,000 sections, there is no greasing, and the image section has also been printed vividly. There was also no peeling of the printing version.

[0076] Mixed solution 1 presentation; HEA 10%, AAm 45%, AANa 45%, in the manufacture approach of the example of 50% considerable-amount comparison of water 1 hydrophilic-property polymer P-1, the presentation of a mixed solution 1 was changed as follows, the polymer P-6 was obtained, and the printing version was obtained and evaluated like the example 1 except having made the amount of P-6 into 54.0% for the amount of Cymel 385 under coating liquid presentation 40.5% further. a result -- a record defect of sense -- it is -- being enough -- it was not able to wear and ink nature was not able to be obtained. Moreover, it was liable to a greasing.

[0077] Mixed solution 1 presentation; HEA 10%, AAm 65%, AA In example of 50% considerable-amount comparison of water 2 example 4, the printing version was obtained and evaluated like the example 4 25% except having made the amount of P-4 into 54.0% for the amount of Cymel 385 under coating liquid presentation 40.5%. a result -- a record defect of sense -- it is -- being enough -- it was not able to wear and ink nature was not able to be obtained.

In the manufacture approach of the example of comparison 3 hydrophilic-property polymer P-1, the presentation of a mixed solution 1 was changed as follows, the polymer P-6 was obtained, and the printing version was obtained and evaluated like the example 1 except having made the amount of P-6 into 54.0% for the amount of Cymel 385 under coating liquid presentation 40.5% further. a result -- an adhesive property with a base material -- and it wore and was inferior to ink nature.

[0078] Mixed solution 1 presentation; HEA 10%, AAm 20%, AANa In the example 2 of example of 50% considerable-amount comparison of water 4 comparison, the printing version was obtained and evaluated like the example 4 70% except having made the amount of P-4 into 74.0% for the amount of Cymel 385 under coating liquid presentation 20.5%. The tear arose for the version during printing.

[0079] The result of examples 1-5 and the examples 1-4 of a comparison is collectively shown in Table 1 [Table 1].

[0080]

[Table 1]

WA (%) tandelta Formula (1) (2) (3)

An example 1 50 0.41 O.K. O.K. O.K. An example 2 95 0.79 O.K. O.K. O.K. Example 3 210 0.40 O.K. O.K. O.K. Example 4 530 0.59 O.K. O.K. O.K. Example 5 780 0.46 O.K. OKOK Example 1 of a comparison 65 0.88O.K. OKNG Example 2 of a comparison 495 0.67 O.K. O.K. NG Example 3 of a comparison 720 0.80 OKOK Example 4 of NG comparison 480 0.35NG OKOK [0081]

[Effect of the Invention] A hydrophilic polymer is used as a principal component, since the ** ink layer which consists of a hydrophilic bridge formation resin layer which has specific viscoelasticity is used as the non-streak section, ink can be efficiently repelled with the water supply amounts of slight dampening water, the control width of face of dampening water is expanded, and the lithography version of this invention is excellent also in print durability.

[Translation done.]